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FINAL REPORT

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CHAPTER FOUR

PHYSICAL PROPERTIES OF THE UPPER ATMOSPHERE

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CHAPTER FOUR

PHYSICAL PROPERTIES OF THE UPPER ATMOSPHERE

I. Introduction

1. In chapter three of this report reference was made to Progress Report No. 1, Contract No. AF19(604)-111. A copy of this was added as an appendix to chapter three. The reason for this was to illustrate how a thorough study of Russian geophysical literature in connection with a research project sponsored by AFCRC, would bring out important questions regarding Russian activity in these areas, as well as lead to conclusions regarding this activity. This intimate relationship between scientific research and scientific intelligence can be developed only if those who are doing the research, are aware of the intelligence problem.

2. It is important to realize empirically the fact that this intelligence awareness does not in any way interfere with a research program. In fact, this writer believes that it aids to open a program, both because of the accessibility to the research mass of information otherwise not available, and also because of the critical character of the study required by intelligence.

3. A second example is given in this chapter. It is based on a comparison between the results of rocket soundings of the upper atmosphere as made by us, and the data presented in recently published Russian literature. Our problem was to determine the source of the data which are presented in the Russian literature, by comparing it with ours. Last year's mission led us to the conclusion that the USSR was not using its high

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altitude rockets to make upper atmosphere soundings. Since then, particularly in recent months, we have seen some publications which, for the first time, show differences between our data and those published by the USSR. This chapter will present an analysis of these differences, and will attempt to draw conclusions from this analysis.

4. The experiences, which led to the preparation of chapters three and four, bring out a suggestion regarding the setting up of a category of AFIC projects which should prove to be of considerable importance in themselves, and of particular significance to AFIC. This proposal has developed from the writer's own experience and the examples will therefore be related to the problems of upper atmospheric physics.

5. The proposal is to set up a series of projects which will do in a number of areas of technical and scientific interest, what was done under the writer's direction, and reported in the June 1951 report "Upper Atmosphere - Survey of Data and Theoretical Analysis," U. S. Weather Bureau Contract Cwb 7904. The successor to this contract is AF19(604)-111. Progress Report No. 2 of this contract is attached to this chapter.

6. The current contract is supervised by the writer and is monitored by a scientist at the Geophysics Research Directorate who is himself aware of intelligence. In the mind of one who is concurrently interested in and working on intelligence problems, this contract provides a natural framework for the analysis of intelligence material. It is just this area of analysis which appears to be one of the most difficult and weakest parts of the intelligence program. One reason for this is the difficulty of obtaining the help of people of sufficient experience

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to undertake these analyses. By setting up such contracts as AF19(604)-111 in the various fields, and by selecting the contractor with particular care and with intelligence problems in mind, the Air Force will obtain a number of important returns for the expenditure of a relatively small amount of money.

7. In the case of the writer's contract AF19(604)-111, and the earlier one with the Weather Bureau, the returns so far have been as follows:

a. The training of one man for the doctorate. Dr. W. R. Bellogg, now at the RAND Corporation, was the senior author and received his degree for part of the work on the contract.

b. Dr. A. Schilling, now with the Institute of Geophysics of the University of California, also worked on this contract, and extended his knowledge of upper atmospheric physics in this way.

c. Mrs. E. K. Kallmann is currently employed on this contract and is working out a doctorate as did Dr. Bellogg.

8. This type of contract is particularly conducive to the development of outstanding people, both because it is a real challenge, and because of the very professional contacts one must make and use during the working out of a report.

9. The first report of this kind received many extremely favorable comments and reviews. It turned out to be a very useful document. Perhaps the most important value from the intelligence point of view of such reports is that they provide not only a bibliography of all available work in the field, but also a careful analysis. Bibliography without analysis is relatively useless. Hence such a contract is a natural requirement that AFIC can place on the AFDC.

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10. It is the writer's very strong opinion that such contracts should be initiated by ARDC as a requirement, but monitored by the ARDC. In the case of the Contract No. AF19(604)-111, it is not reasonable to expect the ARDC on its own initiative to recommend a continuing contract of this kind, since the primary function of the contract is to present periodic reviews and analyses of upper atmospheric data. From the intelligence point of view however such continuity is essential, since these centers of review and analysis must be active and available at all times. Thus only a final requirement from ARDC will justify continuing rather than periodic contracts.

11. In reading this chapter, the reader is urged to keep in mind that in addition to the scientific discussion which is presented, one should consider the general problem of setting up "centers of analysis," which would operate similarly in other fields.

12. It is also important at this point to state something that the reader must have considered upon his reading of this report. We refer here to the fundamental observation that scientific intelligence is a long range requirement, and an expensive one. If one accepts the desirability of developing an effective scientific intelligence program, then one must also accept the need for training people who have special aptitudes for such a program. Research centers of the type referred to in this chapter, and of other types which are especially adapted to intelligence, have the double value of being useful for the training of intelligence minded research people, as well as of producing useful information for the ARDC. It is the writer's strong opinion that these contracts will become one of the best and useful as well as economical ways of establishing and maintaining the ARDC-AFIC connection.

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